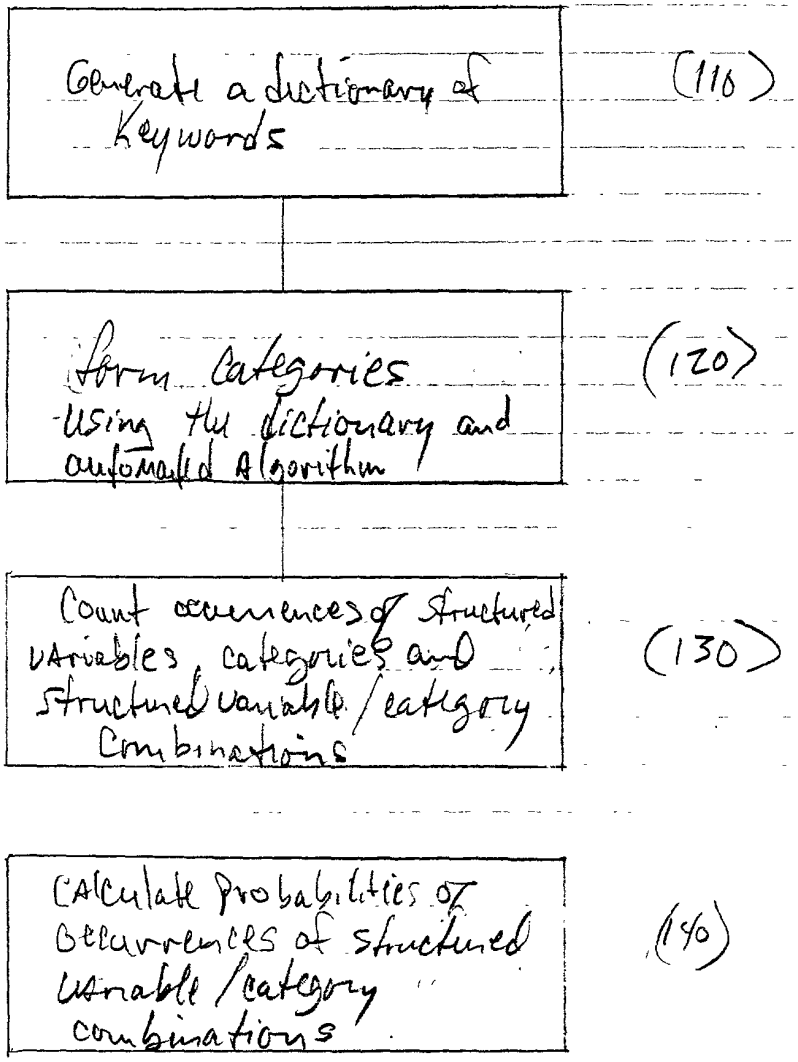
Generate a dictionary of Keywords
(110)
Form categories using the dictionary and automated Algorithm
(120)
Count occurences of structured variables, categories and structured variable/category combinations
(130)
Calculate probabilities of occurrences of structured variable/category combinations
(140)

100

- Figure 1

FIGURE 2

```
for(int i=0; i<total; i + +){
            SparseMatrixRow smr = t.getData(i);
                dictionIndex = smr.positions;
                cat=getCat(i, granularity);
                categoryPos = ((Integer)categoryHash.get(cat)).intValue();
                categoryCount[categoryPos] + +;
        for(int j=0; j<dictionIndex.length; j + +){
            variablePos = dictionIndex[j];
            counter[variablePos][cagtegoryPos] + +;
            variableCount[variablePos] + +;
        }
    }
```

FIGURE 3

Example	Dictionary Term	Category	Count
16	requested	Install Request	1
16	reset	Lotus Notes	1
16	afs	AIX	1
16	password	VM	3
17	www	AFS	1
17	release	Refresh	1
18	adsm	ADSM	1
18	password	VM	4

FIGURE 4

```
Vector v = new Vector ( );

for(int 1=0; i<variableSize; i + +){
        for(int j=0; j<categorySize; j + +){
        //if the expected number of combinations within a given cluster and data is less than the
actual
            if((categoryCount[ j ] * variableCount [ i ])/total < counter [ i ] [ j ]{
                //do Chi function
                probability [ i ] [ j ] = ChiSquared.prob(total, categoryCount [ j ], variableCount [
i ], counter [ i ] [ j ]);
            }
       //if the expected number of combinations within a given cluster and date is more than the
actual
          else{
                probability [ i ] [ j ] = 1.0;
           }
           if (probability [ i ] j[ j ] < probabilityThresh && counter[ i ] [ j ] >
confidenceThresh){
              v.addElement(new EventMarker(variableName [ i ], category [ j ], probability [ i] [
j ], variableCount [ i ],
            }
        }
}
```

	Keywords	Category	Probability	Keyword Count	Category Count	Keyword+Cate...
62	command	AIX	0.0000	170	452	102
63	wordpro	Smartsuite (L...	0.0000	22	50	11
64	customized	Printing	0.0000	125	955	125
65	page	Refresh	0.0000	228	31	28
66	unable	Printing	0.0000	334	955	228
67	install-customiz...	Printing	0.0000	122	955	122
68	autoproxy	Netscape	0.0000	15	77	11
69	password-dce	AFS	0.0000	52	266	39
70	connect-network	Networking	0.0000	64	299	46
71	jobs	Printing	0.0000	121	955	119
72	reset-adsm	ADSM	0.0000	9	94	9
73	connect	Networking	0.0000	262	299	98
74	page-dce	AFS	0.0000	34	266	30
75	rebuilt	Install Request	0.0000	19	109	14
76	p340ua	Printing	0.0000	113	955	111
77	ign	Remote Access	0.0000	40	61	15
78	smart	Smartsuite (L...	0.0000	11	50	7
79	print-successfully	Printing	0.0000	104	955	104
80	password-afs	AFS	0.0000	46	266	34
81	softdist	AIX	0.0000	53	452	48
82	web-page	AFS	0.0000	102	266	52

Fig. 5

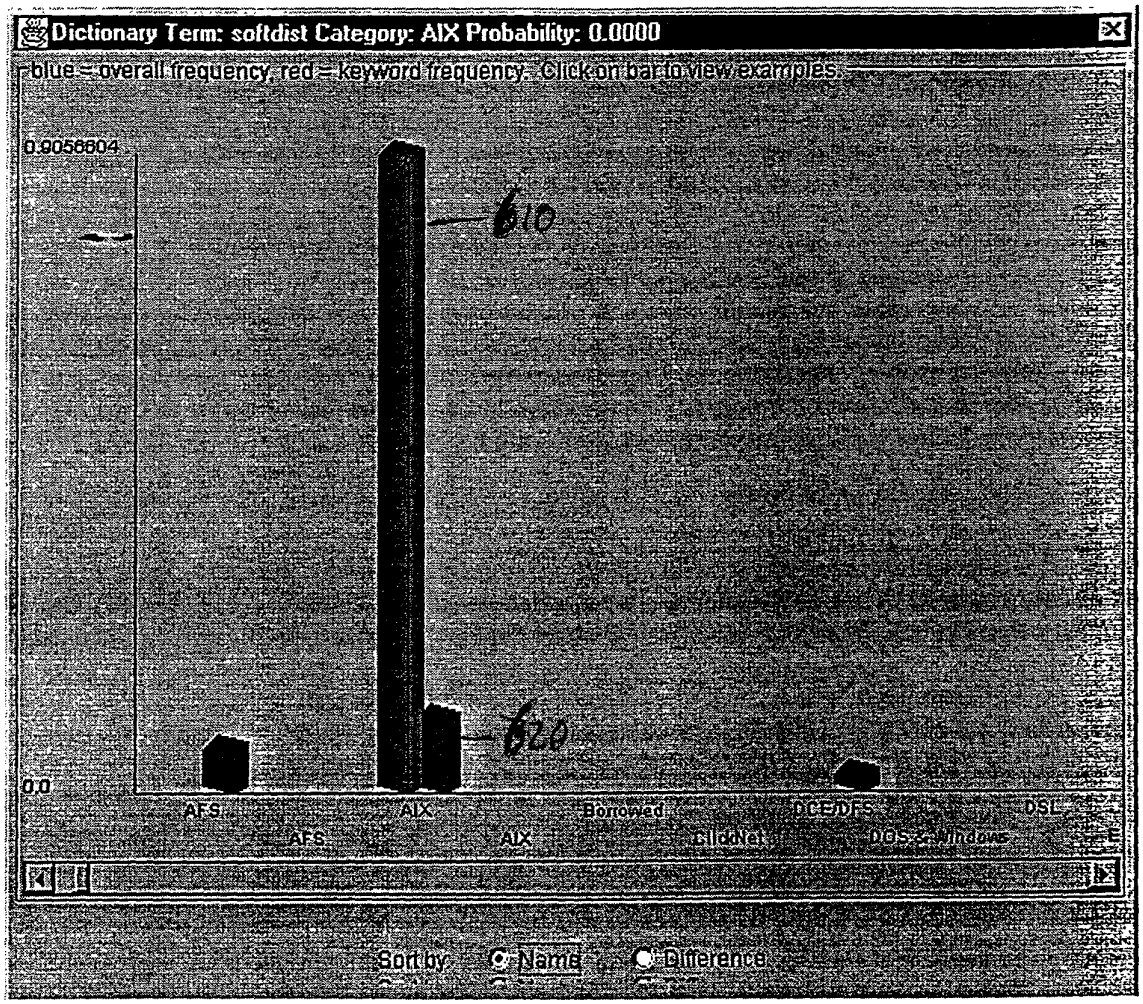
Dictionary Term: softdist Category: AIX Probability: 0.0000
blue = overall frequency, red = keyword frequency. Click on bar to view examples.
0.9056604
0.0
610
620
AFS
AIX
Borrowed
DCE/DFS
DSL
AFS
AIX
ChildNet
DOS & Windows
Sort by:
Name
Difference

Fig. 6

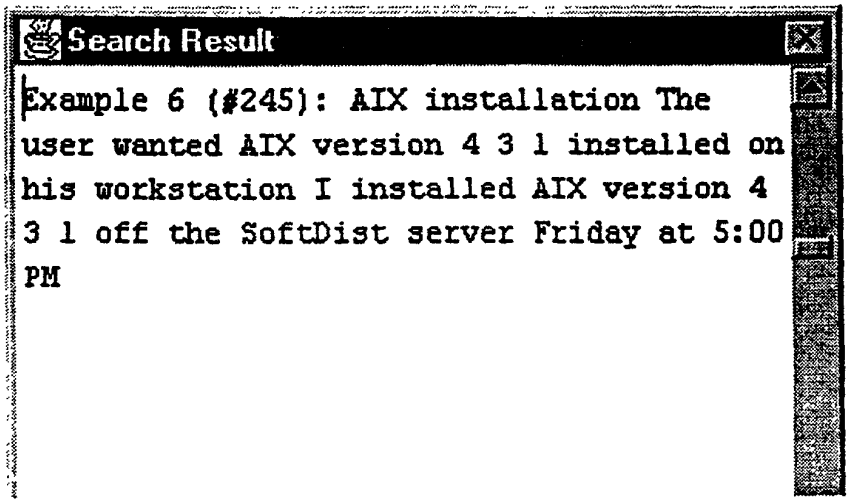
Search Result
Example 6 (#245): AIX installation The user wanted AIX version 4 3 1 installed on his workstation I installed AIX version 4 3 1 off the SoftDist server Friday at 5:00 PM

Figure 7

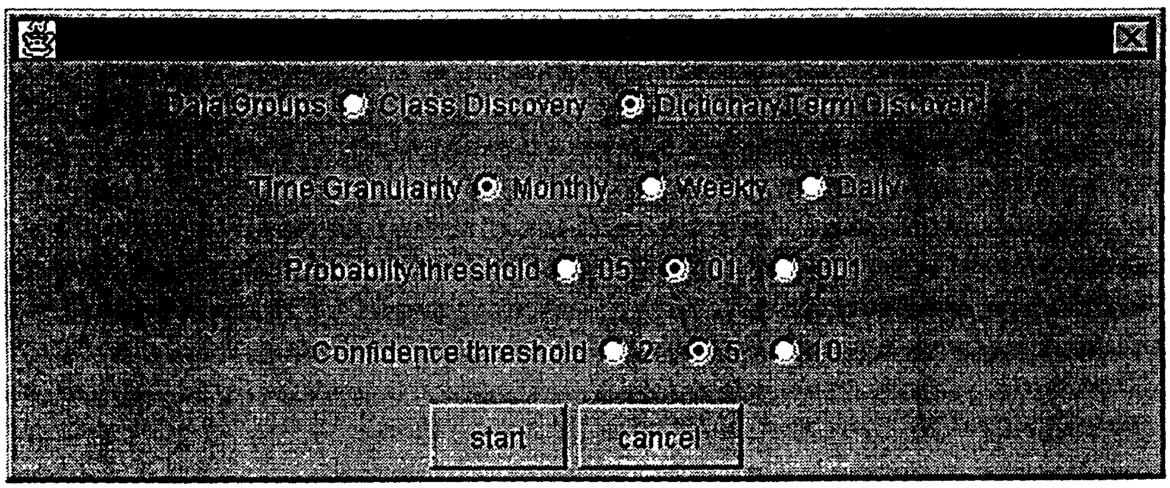
Data Groups
Class Discovery
Dictionary Term Discovery
Time Granularity
Monthly
Weekly
Daily
Probability threshold
.05
.01
.001
Confidence threshold
2
5
10
start
cancel

Figure 8.

FIGURE 9

```
category/Hash = new Hashtable ();
int position = 0;
        Object obj = getCat(i, granularity);

        if (categoryHash.get(obj) = = null) {
          categoryHash.put(obj, new Integer (position));
        position + +;
          }
        }
   Enumeration e = categoryHash.keys();
         while (e.hasMoreElements()){
              Object oo = e.nextElement();
              Integer z = (Integer)categoryHash.get(oo);
              category[z.intValue()] = oo;
}
```

FIGURE 10

```
for(int i=0; i<total; i + +){
        if (discovery.equals("class")){
          variablePos = t.membership[i];
          variableCount[variablePos] + +;
          cat = getCat(i, granularity);
          categoryPos = ((Integer)categoryHash.get(cat)).intValue();
          counter[variablePos][categoryPos] + +;
          categoryCount[categoryPos] + +;

        }
        if (discover.equals("dictionary")){
          SparseMatrixRow smr = t.getData(i);
          dictionIndex = smr.positions;
          cat = getCat (i, granularity);
          categoryPos = ((Integer)categoryHash.get(cat)).intValue();
          categoryCount[categoryPos] + +;

          for(int j=0; j <dictionIndex.length; j + +){
            variablePos = dictionIndex[j];
            counter[variablePos][categoryPos] + +;
            variableCount[variablePos] + +;

          }
        }
```

FIGURE. 11

Example#	Keyword	Date(Weekly)	Counter
12	info	Sun Jan 11 00:00:00 PST 1998	1
12	log	Sun Jan 11 00:00:00 PST 1998	1
12	access	Sun Jan 11 00:00:00 PST 1998	1
12	home	Sun Jan 11 00:00:00 PST 1998	1
12	home	Sun Jan 11 00:00:00 PST 1998	1
13	process	Sun Jan 11 00:00:00 PST 1998	1
13	load	Sun Jan 11 00:00:00 PST 1998	1
13	lost	Sun Jan 11 00:00:00 PST 1998	1
13	explorer	Sun Jan 11 00:00:00 PST 1998	1
13	info	Sun Jan 11 00:00:00 PST 1998	2
13	disk	Sun Jan 11 00:00:00 PST 1998	2
14	ip	Sun Jan 11 00:00:00 PST 1998	1
14	getting	Sun Jan 11 00:00:00 PST 1998	1
14	system	Sun Jan 11 00:00:00 PST 1998	4
14	work	Sun Jan 11 00:00:00 PST 1998	2
14	working	Sun Jan 11 00:00:00 PST 1998	2

FIGURE 12

```
1.      Vector v = new Vector();
2.      for(int i = 0; i < variableSize; i + +){
3.              //if the expected number of examples within a given cluster and date is less than
the actual

4.      if((categoryCount[ j ] * variableCount[ i ])/total < counter[ i ] [ j
]){
5.          //do Chi function
6.              probability [ i ][ j ] = chi.prob(total, categoryCount[ j ], variableCount[ i ],
                counter[ i ][ j ]);
        }
      }
        //if the expected number of examples within a given cluster and date is more than the
actual else{
7.              probability[ i ][ j ] = 1.0;
        }
        if(probability[ i ][ j ] < probabilityThresh && counter[ i ][ j ] >confidenceThresh){

8.      v.addElement(new EventMarker(variableName[ i ], category[ j ], probability[ i ][ j ],
 variableCount [i], categoryCount[j], counter[i][j
]));
        }
    }
  }
```

FIGURE 13

```
public class EventMarker{

        String variable = null;
        Object category = null;
        double probability = 0;
        int totalVariable;
        int totalCat;
        int total;

        public EventMarker(String variableID, Object categoryID, double probID, int
totalVariableID, int totalCatID, int total_____

                variable = variableID;
                category = categoryID;
                probability = probID;
                totalVariable = totalVariableID;
                totalCat = totalCatID;
                total = totalID;
        }
}
```

	Keywords	Date	Probability	Keyword Count	Date Count	Keyword+Date
1	newtext	Feb 1998	0.0000	38	557	37
2	visiblesolution	Feb 1998	0.0000	38	557	37
3	solution	Feb 1998	0.0000	64	557	37
4	project	Jun 1998	0.0000	30	674	23
5	pay	Mar 1998	0.0000	21	738	18
6	refresh	Jun 1998	0.0000	65	674	30
7	callup	Mar 1998	0.0000	56	738	28
8	elimination	Jul 1998	0.0000	24	586	15
9	bringing	Jun 1998	0.0000	15	674	12
10	chapdelaine	Jun 1998	0.0000	11	674	10
11	hernandez	Dec 1998	0.0000	20	358	10
12	setpasswd	Jan 1998	0.0000	36	471	16
13	named	Jan 1998	0.0000	36	471	16
14	netdoor	Jun 1998	0.0000	90	674	34
15	arcprt02	Jul 1998	0.0000	51	586	22
16	d03nm041	May 1998	0.0000	81	483	26
17	p3116h2a	Oct 1998	0.0000	20	534	12
18	arcprt03	Sep 1998	0.0000	20	455	11
19	base	Mar 1998	0.0000	33	738	19
20	rebecca	Dec 1998	0.0000	66	358	19
21	rebecca	Dec 1998	0.0000	82	498	14

Figure 14

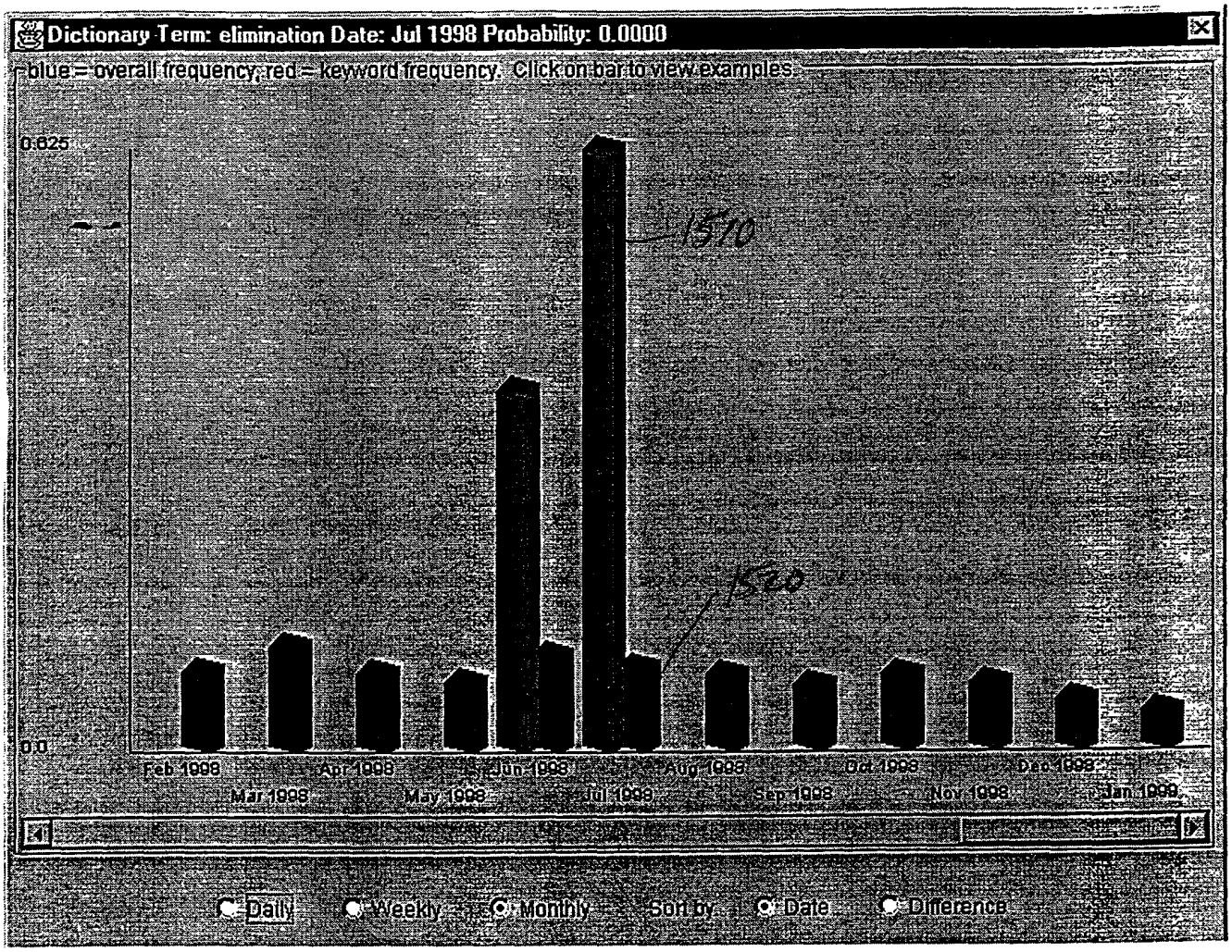
Dictionary Term: elimination Date: Jul 1998 Probability: 0.0000
-blue = overall frequency, red = keyword frequency. Click on bar to view examples.
0.625
0.0
1570
1520
Feb 1998
Mar 1998
Apr 1998
May 1998
Jun 1998
Jul 1998
Aug 1998
Sep 1998
Oct 1998
Nov 1998
Dec 1998
Jan 1999
Daily
Weekly
Monthly
Sort by:
Date
Difference

Figure 15

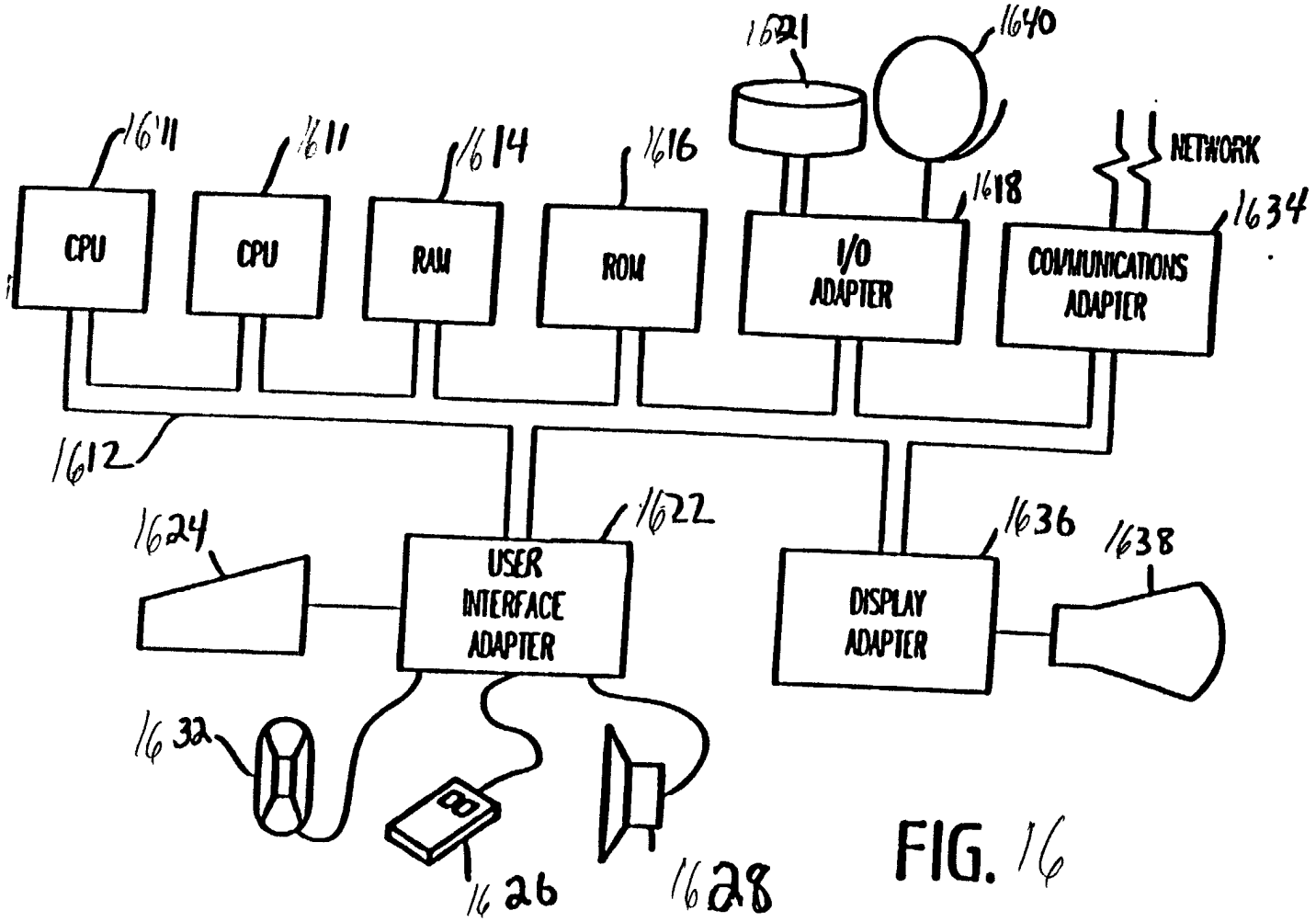

FIG. 16

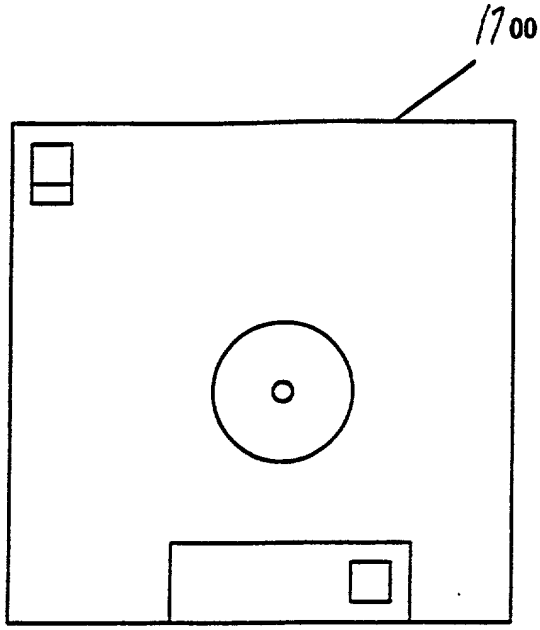

FIGURE 17